# Development of Digital Wave Particle Correlator

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Wave-particle correlator(WPC) instrument can directly observe wave-particle interactions by calculating cross correlation functions between obtained waveforms and detected particles on board. We performed computer simulations in order to examine the function and data quality of the WPC and found that the correlation between the waveform and particle velocity distribution. WPC was conventionally realized by hardware. Additionally, the poor count rate of the particle detector causes the low time resolution.

In this paper, we are developing the WPC for the SCOPE (Scale COupling in Plasma Environment) missoin what explored the magnetosphere tail region. As SCOPE was planned to observe the waveform and particle with much higher resolution than that of Geotail spaceclaft, we must develop the high-spec system. We are now installing the designed wave particle correlator in FPGA chip on the demonstration board and test the program. The basic modules like FFT and FIR filter for calibrating the waveform were designed and installed in FPGA. We will introduce the result of the test WPC program and verify it.